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Demonstrating Sustainable Community Forestry in Ecuador

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Ecuador's northern coastal plain is the epicenter of rapid deforestation in Ecuador. Over the last few decades, the rich coastal rainforests have been reduced to less than 10% of their original range, and they continue to diminish due to the rapid expansion of the agriculture frontier. The primary causes of deforestation are settlement by colonists who clear forests for small-scale agriculture and the rapid growth of industrial oil palm and cacao plantations, that clear large blocks of native forest each year.

The Chocó forest region, which is restricted to the coastal plain in northern Ecuador and southern Colombia, supports one of the most diverse plant communities in the world, with 20% of the plant species found only in this forest region. Most of the remaining forests, whether inside or outside of designated reserves, are inhabited by poor indigenous and colonist communities, like Cristobal Colon, which are dependent on forest resources for their subsistence living.

The conservation strategy of EcoMadera is based on establishing an economic incentive for conserving forests by making sustainable forest management financially competitive with agriculture. To accomplish this, EcoMadera is evolving as a rapidly growing forest products company that practices sustainable forest management and produces wood products for export markets. By creating many new community jobs and providing families with a market for sustainably produced timber, EcoMadera is creating an economic alternative to pervasive forest exploitation. The goal is to build an enduring community enterprise which manages large areas of the landscape in a system of small reserves, managed native forests, forest plantations, and forest restoration projects. In order to provide this alternative, EcoMadera, like any new business, must become a well-run and profitable venture so it can attract investors and talented professionals and can provide new sources of local employment.

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But the challenges are great: EcoMadera works in the midst of well-organized market forces that support forest exploitation. The watershed where the business operates is largely outside the rule of law. The forests are extremely diverse and poorly understood, and most of the timber species have poor markets. No conventional business in Ecuador has attempted to

(continued on page 3)

INSIDE

- Connecting Human Health and Forest Conservation in the Rio Verde Canandé Watershed .....page 10
- Improving Conventional Timber Harvest and Log Yield in Working Forests of the Mountainous Tropics.....page 12
- How to Reconstruct a Rain Forest.....page 14

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Wind turbines.

The strongest market now is the production of wind turbine blades, where its lightweight and strength make it the preferred material for the thinnest part of the blades, where strength is essential. Due to the very rapid growth of wind turbines, especially in China, demand for balsa laminates did not decline heavily in 2008, and by mid 2009 had recovered fully.

EcoMadera buys balsa in logs or in cants from small sawmill operators throughout much of the coastal plain, which are sawn into different dimensions in the plant in Cristobal Colon. They are then dried in the kiln, dimensioned with saws, planers, and jointers, and finally glued together in large blocks. These blocks are sold to Balsaflex, who then cuts the blocks across the grain with a bandsaw to produce end-grain laminates. These are exported to North America, Europe, and Asia. EcoMadera now has a stable client who wants all the balsa blocks that EcoMadera can provide. Thus EcoMadera's entrepreneurs have begun learning the most important fundamental of any business, how to manage cash flow, the lifeblood of any business, on a weekly and monthly basis. But by 2009, it became apparent that EcoMadera's production was severely limited by its kiln capacity. Despite a strong demand from the client, EcoMadera's average monthly production of balsa blocks was limited to about 20,000 to 25,000 board feet, which was well below the break-even point of the business.

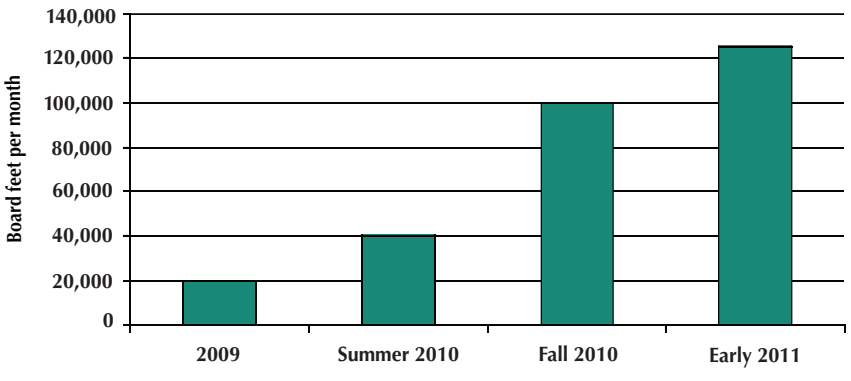
Raising capital to expand the production facility: In order to become a profitable business venture, EcoMadera needed to raise a significant amount of capital to expand the balsa plant. In 2009, Peter and Garrett visited several balsa block facilities, talked extensively with the manager of Balsaflex about how to design better kilns and a more efficient plant, and developed cash flow models to understand how large the business needed to become in order to be viable. The new business plan called for a balsa plant that could reach five times its current production.

Just as EcoMadera set out to raise several hundred thousand dollars in loans or equity investment, the market crashed, and risk aversion became the watchword of creditors and investors. Throughout 2009, Peter Pinchot, as the entrepreneur, talked to banks, Program-Related-Investment (PRI) programs at foundations, social investor organizations, including Root Capital and the Calvert Foundation, international loan organizations such as the Overseas Private Investment Corporation (OPIC), and to several private equity investors. The key obstacles EcoMadera faced was that 1) the business had never produced a profit, 2) it was operating in a poor, developing nation with a high-risk profile, 3) it had an untested business management team, and 4) with a strong social mission, the business could not project high enough returns on investment to appeal to many private equity investors. However, in March of 2010, with support from close family members, EcoMadera was able to secure two private loans totaling $450,000. This investment allowed the business to start its Phase Two construction.

The plant, which includes a large steam boiler, three new kilns, a sawdust extraction system, a much larger shop facility, and high-volume production machinery, can produce 125,000 board feet of product per month, 5 times the 2009 production. As this new equipment becomes operational, it is expected that by November, the business will have generated sufficient revenues to reach profitability. After seven years of uncertainty, it is now becoming clear that the business will survive, and more than that, is poised to grow rapidly and profitably.

In 2004, EcoMadera employed 12 local technicians, most of whom were running chainsaws and working in the illegal timber supply chain before they were hired. EcoMadera now employs 29 people, and by 2011, we expect to have roughly 50 full-time employees in a watershed of 250 families. The key is that EcoMadera is providing employment to families that are desperately in need of income to meet their subsistence needs. These are people who will no

Balsa Monthly Production

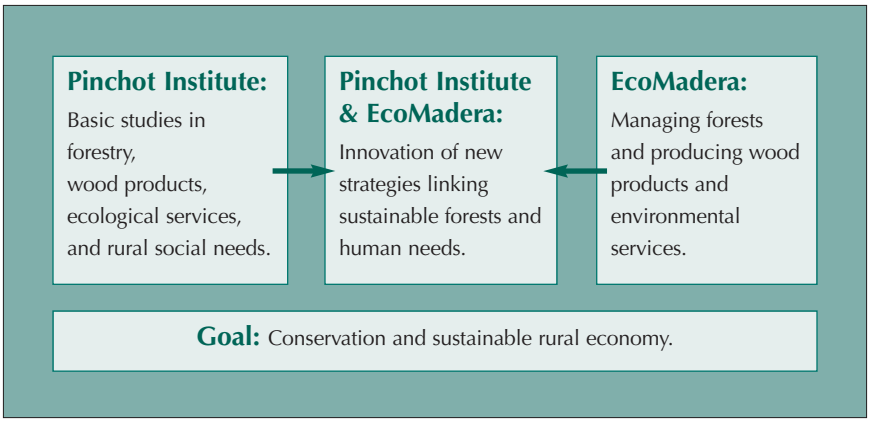


longer be cutting illegal wood from the forests for their livelihood. This is the beginning of the establishment of an alternative local economy based on conserving and restoring forests, rather than clearing them for agriculture.

The EcoMadera Conservation Project: The Pinchot Institute as NGO partner in a hybrid social venture

In order to make the transition from forest exploitation to an ecologically sustainable management of forests, which supports a forest products industry and also benefits communities, EcoMadera must carry out basic research on forest ecosystems, wood technology, wood products, and environmental services. This research, and the innovations which result, have the potential to link well-managed forests to profitable wood products markets. The problem is that in Ecuador, as in many developing nations, basic knowledge about forests and wood products is very scarce. This poses a fundamental structural barrier to the development of sustainable supply chains that provide an economic incentive for conserving forests.

Compare this to the North American experience of the late 1800's. At that time, the United States was at the peak of its own period of forest exploitation. However, by the first decade of the 1900's, land grant colleges, private universities, and the USDA Forest Service had started programs of basic research in forest taxonomy, silviculture, forest ecology, and wood technology. The US Forest Service, state forestry agencies, and the emerging forest products industry began to implement this evolving scientific understanding by innovating new ways to market and manage their forests more efficiently. Businessmen like Fredrick Weyerhaeuser had practiced destructive logging for decades but were now beginning to see that these new practices, based on long-term management of forests and developing valuable wood products, were more profitable over the long term. One such innovation was the production of standard dimensional lumber that could be utilized in the new building technique of balloon frame construction. Through a series of these kinds of innovations in forest management, wood products, and marketing and distribution supply chains, forests became sufficiently valuable as suppliers of resources to justify (for some) the transition to sustainable management. New rural industries in forestry and wood products emerged, which gradually became the dominant economic forces and major employers in many rural regions.



The role of Pinchot Institute as an NGO partner.

In countries without this kind of basic forestry and wood product research, the innovations for the evolution of sustainable forestry are not possible without outside assistance. Thus the Pinchot Institute's fundamental role with EcoMadera is to support basic studies of forests species, wood products, environmental services, and innovations in sustainable forest management, that have the potential to link forests to strong market demand.

Balsa nursery.

With the cable system installed, the crew is using the portable sawmill in the field to extract well-dimensioned lumber for the first time.

Now that there is a sustainable way to extract hardwoods, EcoMadera can begin to harvest dimensional lumber suitable for making flooring. We have made a preliminary alliance with a German flooring manufacturer in Ecuador. Like EcoMadera, they are looking to develop products that utilize as large a percentage of the trees species in the forest as possible. We will continue to develop this partnership in the future as we start managing forests and producing wood products. With the US housing market still in a slump, it has been a good time to avoid entering the flooring market. However, EcoMadera has begun exploring the potential for entering the Chinese housing market, where a rapidly growing middle class and the largest demographic shift in history to urbanization will create a dynamic market for hardwood flooring.

Sustainable forest management of primary forests

With the balsa business moving towards profitability, EcoMadera is preparing to return to its original conservation strategy, which is purchasing large blocks of native forest, in order to implement sustainable forest management, produce hardwood products that raise the value of the forest, and sell them to high value markets, thus creating a model for a widely disseminated alternative to the forces driving deforestation.

In 2008, EcoMadera purchased about 500 hectares, 70% of which was primary forest. The conservation goal over the next two years is to purchase 10,000 hectares of native forestland and to initiate a program of sustainable forest management. EcoMadera's strategy is to establish a new kind of community forest, one owned by both the local community and outside investors, and managed in partnership with professional foresters and community stakeholders. A major focus of the Pinchot Institute's Ecuador program into the future will be on developing the forest management and investment strategies to make it possible to purchase and conserve this quantity of threatened forestland. There are many pieces to integrate in order to make this possible.

Connecting Human Health and Forest Conservation in the Rio Verde Canandé Watershed

Ariel Pinchot

The Andean lowland forest of the Rio Verde Canandé watershed in northern Ecuador is home to three thousand people who have relied largely on timber harvesting and conversion of forest to pastureland for their livelihood. This places pressure on the forests and on the diversity of species in the watershed. EcoMadera LLC, in partnership with the Pinchot Institute, has been working to alleviate these pressures on the forest, by addressing its root cause—chronic rural poverty.

Rural poverty has long been a driving force for deforestation worldwide. In the Rio Verde Canandé watershed, the forest serves as a kind of health insurance for its residents. When an individual becomes sick or suffers an accident, the forest resources are often harvested in order to pay for medical care. USAID has also long recognized that the health of the surrounding forests is strongly linked to the health of individuals in rural communities. A community that has no access to health care finds it difficult to break out of the cycle of poverty that keeps individuals from planning long-term for its forest resources. A local primary school teacher reported that students in Cristobal Colon, the largest village in the watershed, miss a significant number of school days due to illness, thus impeding their ability to advance academically. Sickness often prevents employed individuals from going to work. This problematic convergence of factors significantly increases the pressure on forest resources.

In 2007, two young volunteers for EcoMadera, Ariel Pinchot and Julia Przedvorski, recognizing the link between lack of health care facilities and poverty, conducted a comprehensive assessment of both the heath conditions within the community and the healthcare resources available to the community. The results revealed a harrowing picture of poor health in

Improving Conventional Timber Harvest and Log Yield in Working Forests of the Mountainous Tropics

Blair S. Rynearson
Research Fellow

Encompassing roughly 50,000 hectares, the Rio Canandé watershed is one of the last unprotected and relatively intact areas of Ecuador's Chocó wet forest. Despite longstanding recommendations by foresters for basic improvements of logging methods in the tropics, poor practices are still the norm. Common problems include lack of planning, poor felling, that often results in damaged stems and collateral damage to the remaining stand, wasted timber through selection of only the prime logs, poor skidding practices and unsustainable harvest intensities. Most small-scale timber harvest in the tropical forests of Ecuador involves little more than chainsaws and draft animals. It is largely unregulated, targets a limited number of merchantable species, and is often practiced in conjunction with land conversion. Milling of logs via free hand chain sawing is low yield (25%–35%), and labor spent in extraction via mules is restricted by the distance from rivers, thus concentrating timber harvest to a zone within 2 to 4 kilometers from the river valleys.

Steel cable and ropes used to move logs along cable.

Our research focuses on measuring the expected increase on efficiency and yield with the implementation of the following basic technologies and improved practices: a) a cable system allowing efficient transport of equipment and timber, b) training local technicians in reduced impact logging techniques (RIL), c) the transport of a portable sawmill to the harvest site for increased log yield, and d) wood property testing on species that are currently non-merchantable. Successful implementation of these practices could raise the value of forestland, making it competitive with various forms of land conversion, such as cattle grazing, palm oil, and cacao plantations.

Preliminary analysis suggests that the Peterson portable sawmill has increased log yield to 50%–60%, and drastically reduced flaws in dimensioned lumber. Bunching of logs sawn-to-length to landings, via heavy-duty, Swiss made chainsaw winches appear to have reduced time otherwise spent transporting the saw and milled lumber.

Studies suggest that although adoption of RIL techniques requires an increase in time dedicated to planning, the benefits of reduced damage to timber, decrease in road and skid trail density, and full recovery of felled timber make it economically competitive with conventional logging. Maintenance of forest structure, composition, and function, in addition to reduction in mortality and damage to the remaining stand are of concern for biodiversity and future harvest.

Implications for EcoMadera

We are in the process of sending a container of lumber to a Pennsylvania-based contractor who will include many of our lesser-known species that will be tested, utilized and marketed. Company-owned land would be divided between harvest (60%) and reserve (40%) areas, and in those areas designated for harvest, growth data indicates the suggested removal of 20 m3, per 20-year cycle, is in line with sustained timber yield.

EcoMadera hopes to use revenue generated through polycyclic, sustainable forestry to purchase additional land and to provide employment to the local population, which is currently engaged in illegal logging and land clearing.

We have received support from the USDA Forest Service and hosted a course on cable logging and RIL instructed by Professor Bob Rummer of the Southern Research Station, and Jim Sherar, a retired engineer. In addition to our own staff, local residents, foresters operating out of the Amazon and a forester working in the Chachi indigenous reserve attended the course. The material covered was basic (cable splicing, safe working